National Aeronautics and Space Administration

Technology Opportunity

Technology Transfer & Partnership Office

TOP3–00216

Electric Propulsion Laboratory

Facility

The Electric Propulsion Laboratory (EPL) supports research of spacecraft power and electric propulsion systems. The EPL can support all phases of a propulsion or power system testing of flight-ready hardware from TRL 2–7.

Facility Description

EPL features space simulation chambers that have been enhanced to support the unique requirements of electric propulsion and power system testing. The VF–5 cryopumps 3.5 million liters of air per second with its 33.5 sq meter of 12 K helium cryopanels. The VF–6s solar simulator can provide 1.2 solar constants on a 5-meter diameter target or 11 solar constants on a 30-cm target. Several of the chambers have multiple air-locked access ports. These ports allow several tests to be conducted simultaneously in each chamber without cycling the chamber back to atmospheric pressure during introduction or removal of test hardware. Conditioned dc power is supplied to VF–5, VF–6, and VF–12 for powering ion, hall, and MPD thrusters.

Facility Benefits

Vacuum facilities

- Two world-class facilities (VF–5 and VF–6)
- Four midsize facilities (VF–8, VF–12, VF–13, and VF–67)
- In-house and private industry research programs
- Educated staff of technicians, engineers, researchers, and operators

Building features

- 50,000 sq ft of laboratory and buildup area
- 340 sq ft of class 1,000 clean room
- 15 experimental labs
- Machine shop

Shared facility systems

- LN_2 supplied by a 55,000 gallon dewar
- Closed-loop 45 °C refrigeration 16 tons
- Distributed dc power for electrophysiology testing
- 200 kW (2,000 V, 100 A)
- 40 kW (2,000 V, 20 A)
- 500 kW (200 V, 2,500 A)

Next ion engine test.

Programs and Projects Supported

- In-Space
- Prometheus
- Energetic
- International Space Station
- Jupiter Icing Moon Orbiter (JIMO)

Facility Testing Information

http://facilities.grc.nasa.gov

Contacts

S. Michelle Doehne, Facility Manager
NASA Glenn Research Center
Phone: 216–433–8636
Fax: 216–433–8551
E-mail: Sandra.M.Doehne@nasa.gov

Technology Transfer & Partnership Office
E-mail: ttp@grc.nasa.gov
http://technology.grc.nasa.gov

VF–6 solar simulator.

Capabilities

Space Simulation Facilities—Electric Propulsion Laboratory					
Vacuum Facility	**Dimensions (diam by length)**	**Vacuum system**	**No load pressure, torr**	**Pumping speed liter/sec, air**	**Features**
VF–5	15 by 60 ft long Access: 13 by 30 ft long	Cryopanel 750 W at 20 K, 33.5 m^2 of He surface Diffusion Pumps (20) 32-in. pumps, -50 °F traps	1×10^{-7}	3,500,000 (cryo) 250,000 ODP	Leading testbed for Electric Propulsion thrusters, and Multiple test ports including 6-ft test port
VF–6	25 by 70 ft long	(12) 54-in. nude cryotub	5×10^{-7}	900,000	Multi-role facility supporting high power-electric propulsion performance/life testing, large scale thermal vacuum tests, and solar simulation. 30-kW Solar Simulation, –196 °C/340 kW cold wall 10-ft test port
VF–8	5 by 15 ft long	(4) 35-in. ODP	4×10^{-7}	120,000	Portable cold wall for thrusters, multiple test ports
VF–12	10 by 30 ft Access: 10 by 16 ft	Cryopanels 350 W at 20 K panel temps	8×10^{-8}	1,000,000	Medium to high power electricstatic thruster test bed. Full performance characterization, diagnostics and power suite available
VF–13	5 by 11.5 ft	20-in. cryopump and turbopump	4×10^{-7}	10,500	Rapid turnaround with valved pumping system
VF–67	3.33 by 10 ft	20-in. cryopump	9×10^{-7}	10,000	Sterling testbed

M–1625–17
Oct 07